Global Hydrology Resource Center

Data User Guide

CAMEX-3 DC-8 Airborne Multichannel Microwave Radiometer (AMMR)

Introduction

The CAMEX-3 DC-8 Airborne Multichannel Microwave Radiometer (AMMR)dataset is a browse-only dataset that consists of plotted digital count measurements collected by the Airborne Multichannel Microwave Radiometer (AMMR) during the third field campaign in the Convection And Moisture EXperiment (CAMEX) series, CAMEX-3. This field campaign took place from August to September 1998 based out of Patrick Air Force Base in Florida, with the purpose of studying the various aspects of tropical cyclones in the region. The AMMR was mounted onboard the NASA DC-8 aircraft. Daily browse files in GIF format are available for August 20, September 2, and September 17, 1998.

Notice:
The DC-8 aircraft did not operate each day of the campaign, therefore, data are only available on flight days.

Citation

Wang, James R. 2020. CAMEX-3 DC-8 Airborne Multichannel Microwave Radiometer (AMMR) [indicate subset used]. Dataset available online from the NASA Global Hydrology Resource Center DAAC, Huntsville, Alabama, U.S.A. doi: http://dx.doi.org/10.5067/CAMEX-3/AMMR/DATA101

Keywords:

NASA, GHRC, CAMEX, CAMEX-3, DC-8, AMMR, microwave, radiometer

Campaign

The Convection And Moisture EXperiment (CAMEX) is a series of field research investigations sponsored by the Earth Science Enterprise of NASA. The third field campaign in the CAMEX series, CAMEX-3, ran from August to September 1998 and was based out of Patrick Air Force Base, Florida. CAMEX-3 focused on the study of tropical cyclone

development, tracking, and intensification impacts using NASA-funded aircraft and surface remote sensing instrumentation. The ultimate goal of the campaign was to improve the efficiency of hurricane evacuations and warnings. The campaign successfully studied Hurricanes Bonnie, Danielle, Earl, and Georges (Figure 1). CAMEX-3 yielded high-resolution spatial and temporal data on hurricane structure, dynamics, and motion. These data, when analyzed within the context of more traditional aircraft, satellite, and ground-based radar observations, provided additional insight to hurricane modelers and forecasters who continually strive to improve hurricane predictions. More information about CAMEX-3 can be found on the CAMEX-3 Field Campaign webpage and in Kakar, Goodman, Hood, and Guillory (2006).

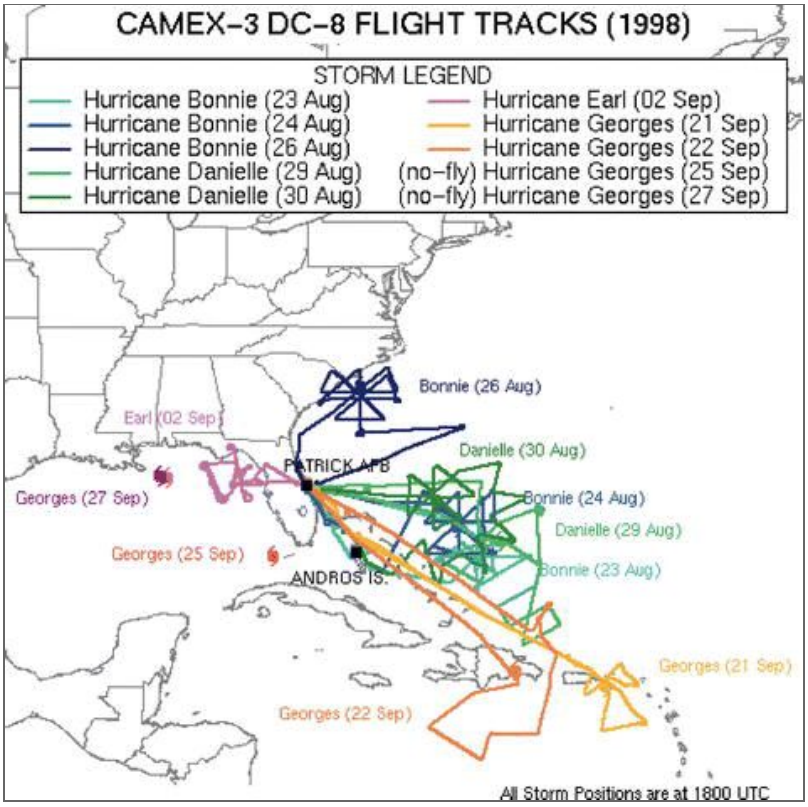

Figure 1: NASA DC-8 Flight Tracks during CAMEX-3
(Image source: Kakar et al. 2006)

Instrument Description

The Airborne Multichannel Microwave Radiometer (AMMR) is an operational passive radiometer system which measures thermal microwave emission (in degrees Kelvin of brightness temperature) from surface and atmosphere. AMMR consists of an array of single-beam radiometers at the frequencies of 10, 18.7, 21, 37, and 92 GHz. The 18.7, 37, and 92 GHz units are dual polarized. The 21/37 GHz unit has been flown in many types of aircraft during the past three decades in various field campaigns. All radiometers have a beamwidth of about 6° and are programmed with radiometric output every second. The major application of AMMR is for precipitation measurements. Other surface parameters

like sea ice, snow and vegetation covers can also be measured. More information about the AMMR instrument can be found at the NASA Airborne Science Program AMMR webpage.

Investigators

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Data Characteristics

The CAMEX-3 DC-8 Airborne Multichannel Microwave Radiometer (AMMR) dataset consists of time-series plots of digital counts data collected by AMMR. The browse files are in GIF format and at a Level 1B processing level. More information about the NASA data processing levels is available on the EOSDIS Data Processing Levels webpage. Table 1 shows the characteristics of this dataset.

Table 1: Data Characteristics

Characteristic	Description
Platform	NASA Douglas DC-8 (DC-8) aircraft
Instrument	Airborne Multichannel Microwave Radiometer (AMMR)
Spatial Coverage	N: 30.477, S: 26.153 , E: -78.982 , W: -86.165 (CARIBBEAN)
Spatial Resolution	1-2 km at surface
Temporal Coverage	August 20, 1998 - September 17, 1998
Temporal Resolution	Daily
Sampling Frequency	1 second
Parameter	Counts (Brightness temperature)
Version	1
Processing Level	1B

File Naming Convention

The CAMEX-3 DC-8 Airborne Multichannel Microwave Radiometer (AMMR) dataset browse files are available in GIF format. The files are named using the following convention:

Browse files: camex3_ammr_YYYYDDD_<ff>ghz.gif

Table X: File naming convention variables

Variable	Description
YYYY	Four-digit year
DDD	Three-digit Julian day
ff	Frequency
.gif	Graphics Interchange Format (GIF)

Data Format and Parameters

The CAMEX-3 DC-8 AMMR dataset consists of browse imagery in GIF format. Each browse image contains three time-series plots of digital counts data: Antenna counts, warm load counts, and cold load counts. An example browse image is shown in Figure 2 below.

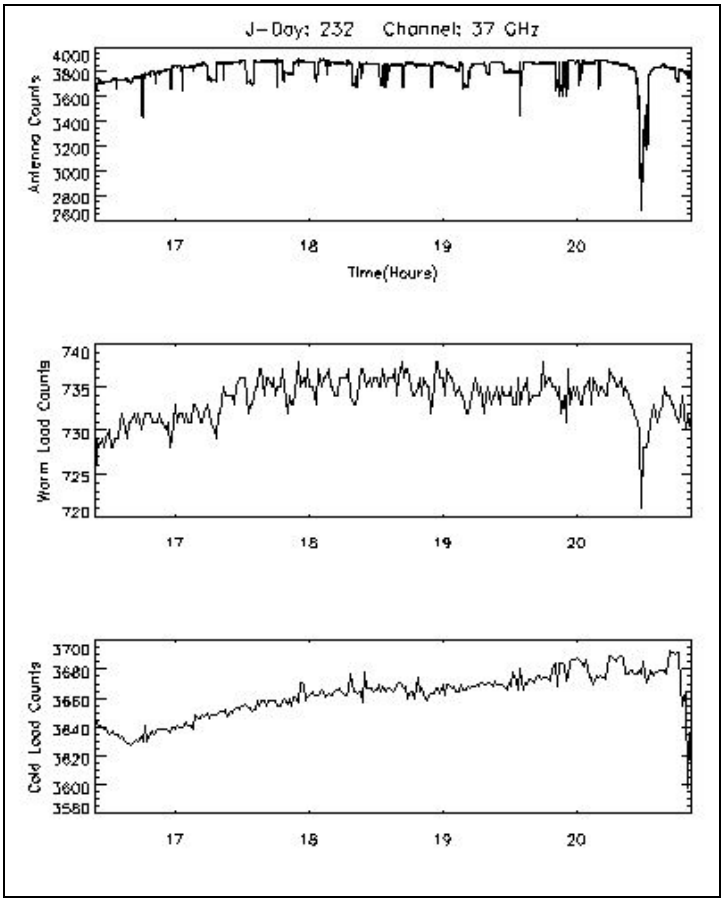

Figure 2: Example of AMMR browse image.

Quality Assessment

The AMMR temperature sensitivity is < 0.5 K, and the calibration accuracy is about ±4 K. The calibration is performed on the ground by viewing targets of known brightness (e.g., sky and absorber with known brightness temperature).

Software

No special software is needed to view the browse imagery. The GIF files can be viewed in most image software.

Known Issues or Missing Data

These data are airborne and flights did not occur each day of the campaign, therefore, data is only available on flight days.

References

Kakar, R., Goodman, M., Hood, R., & Guillory, A. (2006). Overview of the Convection and Moisture Experiment (CAMEX). Journal of the Atmospheric Sciences, 63, 5–18. https://doi.org/10.1175/JAS3607.1

NASA. (2015). NASA Armstrong Fact Sheet: DC-8 Airborne Science Laboratory. https://www.nasa.gov/centers/armstrong/news/FactSheets/FS-050-DFRC.html

Related Data

Other datasets collected during the CAMEX-3 field campaign are considered related to this CAMEX-3 DC-8 AMMR dataset. These datasets can be located using the GHRC HyDRO2.0 search tool and entering the term 'CAMEX-3' in the search box.

Contact Information

To order these data or for further information, please contact:

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